Some phage proteins present potential as probing elements for the detection of pathogens. Examples include the cell wall binding domains (CBDs) of phage endolysins that recognize and bind to the bacterial cell wall and the proteins located at the phage tail fibers (TFP) that mediate attachment of the phage to its receptor on the bacterial surface.

In this work a TFP of a Campylobacter phage and a CBD of a Staphylococcus phage endolysin were combined with microscopy and flow cytometry techniques for the detection of Campylobacter and Staphylococcus.

For this purpose, a Green Fluorescent Protein (GFP) was fused to the N-terminal of the TFP and CBD, expressed by heterologous recombination and purified. Thereafter these fluorescent proteins were hybridized with Gram-positive and Gram negative strains and observed by microscopy. They were also combined with flow cytometry assays and, by eliminating background fluorescence and improving signal to noise, it was possible to measure bacterial loads. Both methods showed the specificity and sensitivity of the TFP and CBD proteins for Campylobacter spp and Staphylococcus spp, respectively.

Overall this work shows that the phage-based assay described herein has potential application in quality control in food industry, environmental, and clinical contexts for detection of Campylobacter and Staphylococcus strains. Further work includes the development of a multiplex tool with the ability to detect several pathogens simultaneously.

A phage-based assay for detection of pathogens

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The incidence of infectious diseases is a major concern worldwide. Their prevention or reduction is dependent on the ability to rapidly identify contributing pathogens.

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